Proposal to WQ PMT

Developing and Implementing Temperature TMDLs
July, 2013

Issue

Implementing Temperature TMDLs in NPDES permits has become increasingly problematic from a compliance standpoint and has been further complicated by recent litigation in Oregon. The issue is twofold: how do we deal with natural conditions in Temperature TMDLs when setting wasteload allocations (WLA) and how do we deal with Temperature TMDLs that will likely result in establishment of unattainable WLAs in an NPDES permit.

As a brief overview, there are limitations to both what a point source discharger can do to decrease receiving water temperatures and what tools are available to keep the discharger in compliance with the standards. Compliance schedules can be issued but have time limits that will likely be exceeded. Variances are also a possibility but can only happen through a rule change. Another possibility is the use of intake credits. In Oregon, under very specific conditions, DEQ may establish a water quality-based effluent limitation allowing the facility to discharge a mass and concentration of the intake pollutant that are no greater than the mass and concentration found in the facility's intake water. A discharger may add mass of the pollutant to its waste stream if an equal or greater mass is removed prior to discharge, so there is no net addition of the pollutant in the discharge compared to the intake water. This might be applicable to temperature if a facility did not add any heat.

In many cases, the nonpoint sources in a TMDL area have a greater degree of impact on receiving water temperature than the point sources, and TMDL modeling studies often show that the system potential of the water is higher than the numeric criteria assigned. System potential temperature is defined as an approximation of the temperatures that would occur under natural conditions. System potential is our best understanding of natural conditions that can be supported by available analytical methods. The simulation of system potential condition uses best estimates of mature riparian vegetation, system potential channel morphology, and system potential microclimate that would occur absent any human alteration. System potential channel morphology is defined as the more stable configuration that would occur with less human disturbance. System potential microclimate is defined as the best estimate of air temperature reductions that are expected under mature riparian vegetation. System potential riparian microclimate can also include changes to wind speed and relative humidity.

Commented [SE(1]: These factors are covered in the draft NC checklist.

Typical temperature TMDLs assign the amount of riparian shade needed to reach system potential temperatures and set load allocations (LAs) based on that, with the understanding that it will take 30-40 years to grow riparian shade and complete implementation of the TMDL. Point sources within the TMDL, on the other hand, are issued WLAs based on the numeric standards, which then have to be met within the next permit cycle (usually within 5 years) or within 10 years if a compliance schedule is issued.

Washington's Water Quality Standards are very limited in what can be done to keep the point source dischargers in compliance while the TMDL is implemented over the long period of time needed to grow riparian shade. Compliance schedules can be issued for up to 10 years to allow the discharger to do whatever they can to attempt to meet standards, but this timing falls well short of the time it takes to grow trees and reach system potential. At the time that mature riparian vegetation has been established, and if other channel attributes had also stabilized (including system potential channel morphology and microclimate) , the waterbody would either be in compliance with numeric standards or would be considered in compliance because it would have reached system potential temperature. At that time, a

Use Attainability Analysis (UAA) could be done to set specific standards for that waterbody based on the system potential temperature, which would be considered equivalent to the "natural condition."

Commented [SE(2]: May be a site-specific criteria instead of a UAA if the use is still correct.

TMDL staff have explored using the natural condition provision in the water quality standards as a basis to set WLAs based on the modeled system potential, especially where you have intermittent or effluent dominated streams with low flows (thus not providing the ability for mixing to keep the discharger in compliance with numeric criteria). The Hangman Creek TMDL used this approach, and other recent TMDLs have explored this possibility. However, recent litigation in Oregon has caused us to rethink whether this approach might have some risk in the future (because we have similar language in our WQS and were poised to develop similar TMDLS). The risks are from both a legal standpoint and a risk of our temperature TMDLs being vacated, such as is happening in Oregon.

Oregon Temperature Lawsuit

At the January 2013 two-day PMT meeting, there was a discussion of the Oregon temperature lawsuit and how it might affect Washington TMDLs. The court found EPA's approval of the natural conditions criterion in Oregon's water quality standards to be arbitrary and capricious because:

1. It supplants the numeric criterion. The Clean Water Act allows establishment of narrative criteria "where numerical criteria cannot be established or to supplement numerical criteria." This is not what Oregon's natural conditions criterion does. Instead, it allows "Oregon to replace the numeric criterion (determined to be protective of salmonids) with a new numeric standard during the TMDL process. The replacement of one numeric standard with another less-protective numeric standard cannot be viewed as 'supplementing' the first standard."
2. "The natural conditions criterion is based on the assumption that if historical water temperatures protected salmonids then, the same water temperatures would protect salmonids now. This reasoning ignores or otherwise discounts the historical changes to salmonid populations and river conditions. The record clearly demonstrates that many of Oregon's modern waterbodies have undergone dramatic changes and are no longer the rivers they once were. The natural conditions criterion attempts to restore one aspect of Oregon's historical water conditions (higher temperatures in some waterbodies) without restoring the other conditions that allowed salmonids to thrive." Those other conditions include channel morphology, large wood, cold water refugia, water clarity, gravelly bottom, riparian microclimate, presence of food, etc.
3. Estimating historical water temperatures "is a process rife with uncertainty."

Commented [SE(3]: This implies that we need WQS with criteria designed more specifically for individual water bodies rather than lumped categories. Need to consider refugia and other conditions that support the use.

Proposal

How to deal with waterbodies that will need a Natural Conditions Call:

1. Before making a project request to EAP to start a temperature TMDL, we should think through whether or not we expect that the TMDL will result in a natural conditions call. If this is likely, the project request should include a requirement to analyze the other habitat factors in the watershed that protected the aquatic life use in the past (prior to human impacts). This will require us to perform a broader analysis of watershed conditions, and to be prepared to show why the other factors will still protect the use if we determine that the natural temperature is higher than the numeric standard. That additional analysis would include assessment of system potential microclimate and channel morphology, groundwater inflows, hyporheic exchange, and other habitat features. This kind of more in depth analysis would help us to make a "natural conditions" call based on a set of habitat attributes instead of on just one.
2. If we do make a natural conditions call in a temperature TMDL, we will not necessarily be able to use the modeled natural condition to set WLAs for point sources. The Oregon court found that this, in effect, changed the standard by supplanting the numeric criteria, so although we have done this once before, it may not be a good idea to do it again. This will be a risk-based decision and we may be able to build a better defense with TMDLs that have gathered adequate information to support the natural condition call, and where it makes the most sense (low flow, effluent dominated streams, for example).

Commented [SE(4]: Essentially all Aquatic Life Use criteria (which are so dependant on the natural setting of the river) TMDLs should include a study capable of modeling natural conditions.

Commented [SE(5]: This is what the use of the Performane-Based Approach to Site-Specific Criteria and the Natural Conditions Modeling Checklist would do.

Commented [SE(6]: We could if we see the TMDL through with the Performance-Based Approach and establish the new site-specific criteria within the standards through rulemaking.

Commented [SE(7]: The Natural Conditions Checklist can provide the supporting evidence.

How to deal with a new TMDL that we expect to result in an unattainable WLA:

Prior to starting a new temperature TMDL that includes point sources, both TMDL and permit staff should work together to assess the likelihood that the TMDL will cause serious compliance problems for one or more point source dischargers. If it is likely, we can—

- Delay starting the TMDL.
- Consider whether an extended mixing zone could be issued as part of the permit. Before allowing an extended mixing zone, it would need to be demonstrated to Ecology that:
  - AKART is applied.
  - All other options that are *economically achievable* are being utilized. And
  - Granting the exception would not have the *reasonable potential* to cause a loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses of the water body, result in damage to the ecosystem, or adversely affect public health.
- Consider all reasonable potential scenarios that can be done within the scope of the facility to cool effluent temperatures and achieve compliance with the numeric standards, such as: shade/cover for the clarifier, aeration/spray cooling, or discharging only at night. Cost effectiveness should be considered where you may achieve cooler water (such as with chillers) but the cooler effluent will not result in cooling the receiving water because of the thermal potential of the receiving water.
- Consider whether the discharger could use off-site options to meet numeric standards, such as water rights trading, flow augmentation, industrial pretreatment, or water quality trading (although temperature trading is problematic). None of these are easy options, and the problem of not being able to attain numeric standards most often seems to occur with small dischargers on small streams, in towns without a lot of money.

How to deal with previously approved TMDLs that have unattainable WLAs for Permitted Dischargers:

1. Consider whether the discharger could qualify for an extended mixing zone.

2. Issue a compliance schedule as part of permit reissuance, to provide time to determine feasible treatment and disposal alternatives to meet final effluent limits, and consider structural changes. Compliance schedules can be issued for up to two permit cycles, or 10 years.
3. For permits that have been issued compliance schedules and have made all feasible attempts to reduce temperature in the receiving water but are nearing the 10 year limit and still aren't meeting final effluent limits, consider issuing a variance for the permit. The basis of the variance would be to allow additional time for the TMDL to be implemented (this would likely involve growing riparian shade to reach system potential temperatures). This requires rule-making, but is probably the only currently existing tool that will keep the permit in compliance. Variances must be reissued every 5 years under current rule.
4. Administratively extend the permit indefinitely. This is not a preferred option, as it would also delay other, perhaps more pressing compliance issues, such as nutrient control.

Longer Term Solutions
It appears the only feasible long-term solutions will involve changes in the water quality standards:

1. Add language to allow an exemption from meeting the temperature standards under certain conditions, such as when naturally occurring low flow, intermittent or ephemeral streams lead to effluent dominant systems. This would require defining these conditions and determining when they would apply.
2. Add language in the standards to allow "intake credits" to be used, similar to Oregon's approach.
3. Consider doing a variance that would allows the permitted discharger to be in compliance until a TMDL is implemented over the long term and either standards are met or the system potential temperature is reached. EPA has recently introduced the concept of issuing variances for multiple dischargers, which might work well for temperature challenges affecting multiple dischargers.
4. Conduct UAAs for intermittent streams. According to some recent conversations that Elaine Snouwaert from ERO had with EPA when she recently attended the WQ Standards Academy, if a stream is truly intermittent naturally than it should be an "easy" UAA under Factor 2 of 40 CFR 131.10(g) (naturally occurring flow conditions prevent the attainment of the use). It might also be possible to do a categorical UAA where all streams that meet a strict definition could be included into one UAA for a categorical change. Another option suggested by EPA would be to develop a streamlined approach for doing UAAs for these types of situations.
5. Elaine also has discussed with Region 10 EPA staff the possibility of doing a "performance based approach" to developing seasonal criteria to address some of the issues we have with intermittent streams. The numeric criteria would remain as they are when there is the presence of enough water to support them (and the uses) but would be different for the low flow times of year (also when any fish would likely not be present).

Commented [SE(8]: This could also be done with a phased TMDL as described in the Performance-Based Approach with Phased TMDL.

PMT Action Requested
Direction from PMT on moving forward with preferred option.